

1 TO WHOM IT MAY CONCERN:

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3 BE IT KNOW THAT WE, RONALD T. BUTLER, a  
4 citizen of the United States of America, residing in  
5 Santa Barbara, in the County of Santa Barbara, State of  
6 California, and ALAN GEORGEFF, a citizen of the United  
7 States of America, residing in Newbury Park, in the  
8 County of Ventura, State of California, have invented a  
9 new and useful improvement in

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12 GAUGING APPARATUS AND METHOD

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1                                    **BACKGROUND OF THE INVENTION**

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3                    This invention relates generally to accurate  
4    selection and installation of vehicle wheels and tires,  
5    and more specifically concerns provision of apparatus  
6    and methods to achieve such selection and installation,  
7    rapidly and accurately.

8            In the past, vehicle tires, installed on metallic  
9    wheels, were selected by visually estimating the sizes  
10   of tires and wheels to be installed. Generally this  
11   required installation of a series of wheels and tires,  
12   until a satisfactory fit of a wheel and tire to the  
13   vehicle wheel well space was achieved. Such procedures  
14   were inefficient, time consuming and required time and  
15   labor to mount several wheels, with different tires  
16   until the desired result was achieved. The problems  
17   included interference, or potential interference, of  
18   oversize tires with fenders and fender edges,  
19   particularly during wheel turning, and interference  
20   with vehicle structure, such as struts, shock  
21   absorbers, tie rods, and other vehicle equipment facing  
22   the wheel well. The problems became acute when it was  
23   desired to install wide or larger size tires as on  
24   racing vehicles. No way was known to achieve the  
25   highly advantageous results and methods of wheel and

1 tire size selection, as are now provided by the present  
2 invention.

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4 **SUMMARY OF THE INVENTION**

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6 It is a major object of the invention to  
7 provide apparatus and method to overcome the above  
8 referenced problems and difficulties. Basically, the  
9 apparatus of the invention includes provision of a  
10 multiple gauge assembly for establishing vehicle wheel  
11 rim and tire sizes to prevent interference with vehicle  
12 structure facing the wheel, as during directional  
13 turning of the wheel on a vehicle wheel mount, about a  
14 pivot axis normal to the wheel axis, comprises in  
15 combination:

- 16 a) a first adjustable gauge to establish a  
17 rim edge radial dimension, from that wheel axis,  
18 b) a second adjustable gauge to establish a  
19 rim offset or back spacing dimension in a direction  
20 generally parallel to the wheel axis,  
21 c) and a third adjustable gauge to  
22 establish a tire peripheral dimension generally  
23 parallel to said wheel axis,  
24 d) whereby clearance between the wheel and

1 said vehicle structure can be predictively ascertained,  
2 as by gauge assembly manipulation, prior to  
3 installation of the wheel on the mount.

4           It is another object of the invention to  
5 provide the first gauge which is elongated in a first  
6 direction, second gauge elongation in a second  
7 direction, such first and second directions being  
8 mutually substantially perpendicular. The third gauge  
9 is typically elongated in a third direction  
10 substantially parallel to said second direction.

11           A further object is to provide for the  
12 assembly to include a first carrier supporting the  
13 first gauge for linear adjustable movement in said  
14 first direction, and a second carrier supporting the  
15 second gauge for linear adjustable movement in second  
16 direction. In this regard, the assembly may include a  
17 third carrier supporting the third gauge for linear  
18 adjustable movement in a third direction relative to  
19 the wheel axis. Further, the second direction is  
20 typically substantially perpendicular to the first  
21 direction, and the third direction is substantially  
22 parallel to said second direction.

23           Yet another object is to provide a gauge  
24 assembly in which the first, second and third gauges  
25 have sliding interconnection, with said first, second  
26 and third carriers, respectively.

1           An additional object is to provide a  
2 connector plate carrying the gauge assembly, and  
3 configured for bolt-on connection to the vehicle wheel  
4 mount. In this regard, the multiple carriers are  
5 rigidly carried by that connector plate, to project in  
6 directions accommodating shifting of three gauge  
7 sliders, and pivoting of all three shifted sliders with  
8 the wheel mount, to determine the existence and extents  
9 of gauge assembly clearance with respect to vehicle  
10 structure facing the wheel well, all prior to any need  
11 for wheel and tire mounting or installation to the  
12 wheel mount. The sliders may be shifted to assure  
13 sufficient clearances, and satisfactory wheel and tire  
14 sizes may then be rapidly and accurately determined  
15 from the shifted gauge slider positions.

16           The basic method of the invention includes  
17 provision of a gauge assembly, as referred to, its  
18 installation on a vehicle wheel mount, gauge slider  
19 shifting to assure clearances as referred to, and  
20 readout of gauge slider positions.

21           These and other objects and advantages of  
22 the invention, as well as the details of an  
23 illustrative embodiment, will be more fully understood  
24 from the following specification and drawings, in  
25 which:

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**DRAWING DESCRIPTION**

Fig. 1 is a frontal elevation of a multiple gauge assembly incorporating the invention;

Fig. 1a is an enlarged section taken on lines 1a-1a of Fig. 1;

Fig. 2 is a rear elevation of the assembly of Fig. 1;

Fig. 2a is a side elevation taken on lines 2a-2a of Fig. 2;

Fig. 3 is a perspective view of one form of adapter plate used to connect the Fig. 1 assembly to a vehicle wheel mount;

Fig. 4 is a view like Fig. 3, showing another form of adapter plate;

Fig. 5 is a perspective view showing installation of the adapter plate and gauge assembly onto a vehicle wheel mount, in a vehicle wheel well; and

Fig. 6 is a schematic view showing correspondence between gauge settings and a vehicle wheel and tire, to be installed in mounted condition.



1           Such vehicle structure may include the curved  
2 or projecting rim 20 of a vehicle fender 21 facing the  
3 wheel well, and structure 22 such as a shock absorber  
4 or absorbers 23, and/or a strut or struts or a tie rod  
5 or tie rods 24.

6           As shown, and with regard to the installed  
7 assembly, the first gauge 13 is elongated in a first  
8 direction 23 extending away from axis 12, and the  
9 second gauge 15 is elongated in a second direction  
10 indicated at 17, generally parallel to axis 12, said  
11 first and second directions being mutually  
12 perpendicular, or substantially perpendicular. The  
13 third gauge 18 is elongated in a third direction seen  
14 at 25, which is substantially parallel to second  
15 direction 17.

16           The assembly includes a first carrier 26  
17 supporting the first gauge 13 for linear adjustable  
18 movement in direction or directions 23, and a second  
19 and transverse carrier 27 supporting the second gauge  
20 15 for linear adjustable movement in a second direction  
21 24. Carrier 26 is carried by mount 50 and carrier 27  
22 is or may be carried by gauge 13, as shown. The  
23 assembly may also include a third carrier 28 carried by  
24 14 and supporting the third gauge 18 for linear  
25 adjustable movement in third direction or directions  
26 35. Carrier 28 is supported by vertical slide 38,

1   slidable in a carrier 39 attached to 26, but not to 27.  
2   The carriers may be elongated as shown, and have like  
3   sides 30, 31 and 32, gauge edge guides 33, 34 and 35,  
4   and set screws 60 to clamp edge guides, and that may be  
5   loosened to allow gauge adjustment and tightening, to  
6   fix the gauges in selected positions. The carriers are  
7   operatively interconnected.

8               Note that the second direction is  
9   substantially perpendicular to said first direction,  
10   and the third direction is substantially parallel to  
11   said second direction; and the first, second and third  
12   gauges have sliding interconnection with the first,  
13   second and third carriers, respectively. The gauges  
14   have indicia thereon, as at 40, 41 and 42, that  
15   indicates dimensions corresponding to vehicle wheel and  
16   tire radial, rim offset (back spacing), and tire  
17   dimensions indicated at 44, 45 and 46 relatively, as in  
18   Fig. 6.

19              A connector plate 50 carries said assembly  
20   10, and is configured for bolt-on connection to the  
21   vehicle wheel, hub or mount 51. Hub 51 is turnable  
22   with the mounted (selected) wheel 52, about axis 12.  
23   Mount 51 is also turnable with the wheel (by steering)  
24   about pivot axis 11 normal to axis 12.

1               Bolts 60 project from hub or mount 51 for  
2 attachment to the wheel 52, or to the connector plate  
3 50.

4               Fig. 3 shows connector plate 50, with  
5 openings 50' to pass bolts 60; and Fig. 4 shows an  
6 alternate plate 50a, with openings 50a' to pass bolts.  
7 A lug 62 projects from the plate.

8               Indicia on the gauges or sliders register  
9 with edges 51-53 to indicate measurements.

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